

APPENDIX H

WATERSHED ANALYSIS

Introduction

Watershed analysis is an approach adopted by the Washington Forest Practices Board in 1992 to address the cumulative effects of forest practices on fish, water quality, and public improvements. It is currently applied to Watershed Administrative Units (WAUs) 10,000-50,000 acres in size (WAC 222-22-020, in WFPB 1998). Watersheds generally subject to watershed analysis include WAUs that meet each of the following criteria:

- (a) not classified as “agricultural lands”;
- (b) < 80 percent Federal ownership; and
- (c) >1,000 acres of forested lands.

Of the approximately 800 WAUs that have been delineated across Washington State, approximately 610 (or roughly 75 percent) meet these criteria.

The stated goals of watershed analysis are:

“... to address [the] cumulative effects of forest practices on the public resources of fish, water, and capital improvements of the state or its political subdivisions. The long-term objective of this rule is to protect and restore these public resources and the productive capacity of fish habitat adversely affected by forest practices while maintaining a viable forest products industry. ... This system also allows for monitoring, subsequent watershed analysis, and adaptive management.” (WAC 222-22-020, in WFPB 1998).

The purpose of this appendix is to consider watershed analysis in the context of the three proposed alternatives. Specifically, the objective is to assess how well each of the alternatives meet the original goals of the watershed analysis approach adopted by Washington’s Forest Practices Board. Before doing that, it is necessary to briefly describe the current process, outline the proposed changes to watershed analysis under each alternative, and describe the extent to which watershed analysis has been applied to private and state forest lands over the past eight years.

Watershed Analysis under Each Alternative

Before assessing how well each of the alternatives meet the original goals of watershed analysis, it is first necessary to describe how Alternative 2 and 3 differ from the existing process under Alternative 1. Table 1 summarizes the major changes and additions proposed under each alternative in terms of modules included and prescription requirements. Under each alternative, watershed analysis would



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be mandatory for DNR as funding allows and voluntary for landowners. Substantive differences between the alternatives are described below.

Table 1. Proposed Changes to Watershed Analysis Under each Alternative.

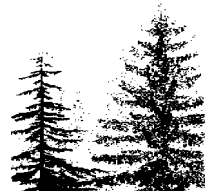
Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forest & Fish Report)	Alternative 3
❖ Mandatory for DNR as funding allows	❖ Mandatory for DNR as funding allows	❖ Mandatory for DNR as funding allows
❖ Voluntary for landowners	❖ Voluntary for landowners	❖ Voluntary for landowners
❖ Nine modules currently included	❖ The same nine modules in Alternative 1 would be included, plus others (see below).	❖ The same nine modules in Alternative 1 would be included, plus others (see below).
❖ Prescriptions written for all hazard modules	❖ No prescriptions required for riparian function, mass wasting, and surface erosion modules	❖ No prescriptions required for riparian function, mass wasting, and surface erosion modules.
❖ Eastside hydrology module developed	❖ Eastside hydrology module developed	❖ Eastside hydrology module developed
❖ Water quality module revised to meet CWA requirements	❖ Water quality module revised to meet CWA requirements	❖ Water quality module revised to meet CWA requirements
	❖ Addition of cultural resources and restoration modules	❖ Required restoration plans for new assessments
	❖ Use in effectiveness monitoring	❖ Required monitoring as part of all new watershed analyses
	❖ 5-year permit available to landowners within completed watersheds	❖ Use in effectiveness monitoring
		❖ 5-year permit available to landowners within completed watersheds

Alternative 1

Under Alternative 1, watershed analysis includes the original nine modules: mass wasting, surface erosion, hydrology, riparian, stream channel, fish habitat, water quality, water supply/public works, and routing. An eastside hydrology module would be developed. The team of analysts completing the modules describe situations needing protection and a team made up of managers and analysts determines the required and voluntary forest practices (prescriptions) for each identified area of resource assessment.

Alternative 2

In an effort to simplify certain modules of the watershed analysis process by applying knowledge accumulated through past assessments, the riparian and surface erosion modules would not include a prescription phase under Alternative 2. Instead, the standard rules, in part based upon the results of



previously completed watershed analyses, are expected to address riparian and surface erosion concerns at both the site and cumulative watershed scales. Effectiveness monitoring under the adaptive management program will evaluate the adequacy of these rules for meeting their performance targets. In addition, the necessity for hazard mapping in the mass wasting module would be eliminated (contingent on adequate funding and completion of statewide hazard mapping).

To strengthen existing gaps in the current process, the following new modules would be developed and incorporated into the process: eastside hydrology, restoration, monitoring, and cultural resources. The assessment phase of these new modules would be required; however, implementation would be voluntary for the restoration and monitoring modules. Implementation would be required for eastside hydrology and cultural resources.¹

Alternative 3

Under Alternative 3, the existing modules would remain the same and watershed analysis would be mandatory with prescriptions written for all modules. An eastside hydrology module would be developed. There would not be cultural resources modules; however, the degree of incidental protection provided for riparian habitat and wetlands would be expected to increase significantly. A monitoring effort would be voluntary for WAUs with completed watershed analyses and required as part of all new assessments. A restoration plan would also be required as part of future watershed analyses.

Current Status of Implementation

Watershed analysis has been conducted on approximately 10 percent of the private and state forested lands of Washington since the program was implemented in 1992. DNR estimates a reasonable rate of completion to be roughly 10 assessments per year (N. Sturhan, personal communication). Using this estimate, it would take at least 60 years to complete the process on all remaining eligible WAUs.

Watershed analysis provides a process for landowners in a watershed to conduct forest practices in areas of resource sensitivity without further conditioning of FPAs by the DNR, as long as prescriptions developed for the watershed analysis are implemented.

Attainment of Goals Set Forth by the Forest Practices Rules

The purpose of this section is to compare how successful each of the alternatives is in meeting the stated goals of watershed analysis (see Introduction). Specifically, the following management goals were considered:

- (a) cumulative effects assessment methodology;
- (b) watershed restoration tool; and
- (c) adaptive management strategy (see Appendix I).

¹ Unless otherwise required by existing laws and regulations or by an HCP implementation agreement.



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Collins and Pess (1997) provide perhaps the most comprehensive evaluation of the effectiveness of Washington State's existing watershed analysis process in meeting these management goals in their report entitled, "Critique of Washington's Watershed Analysis Program" (1997). The authors analyzed land management prescriptions developed for the first 20 watershed analyses (those completed by June 1995).

(a) Providing a Cumulative Effects Assessment Methodology

Watershed analysis describes two types of cumulative effects, resulting: (1) "from the accumulation of the small effects of many forest practices that are insignificant at any one site, including practices conducted over time or space;" and (2) "from changes in dominant watershed processes, even when activities triggering effects are limited in spatial extent" (WFB, 1994, p. xv).

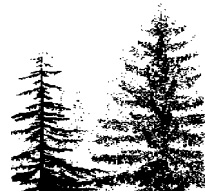
Collins and Pess (1997) state that a strength of the current cumulative effects assessment method is in identifying and reducing the dominant, direct physical effects of forest land uses on salmonid habitat. They suggest this could be further strengthened by placing more emphasis on identifying problems that can be immediately remedied (e.g., identifying road erosion and landslide trigger sites; correctly locating fish-bearing waters, and identifying anthropogenic fish passage impediments). Collins and Pess (1997) also suggest that the cumulative effects assessment could be improved by "more effectively assessing and integrating changes from more than one type of input to streams ... and examining whether assumptions about those inputs are scientifically defensible."

Collins and Pess (1997) suggest that to better address cumulative effects, assessment methods should include "all relevant inputs (e.g., effects of forest practices on spring snowmelt hydrology, which currently has no methodology) and develop necessary assessment tools (e.g., effects of peak flows on stream channels), and correct assumptions that are inconsistent with the scientific literature (e.g., the functions of large woody debris is the same in all types of stream channels)."

Table 2 summarizes how each of the alternatives meets the goal of providing a cumulative effects assessment methodology for WAUs that are impacted by forest practices.

Table 2. Summary of How Each Alternative Meets the Goal of Providing a Cumulative Effects Assessment Methodology

Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forest & Fish Report)	Alternative 3
❖ Same success rate in meeting goals of providing a Cumulative Effects Assessment Tool as currently exists. See discussion above.	❖ Incorporates new modules; improvement in capturing "all relevant inputs" ❖ Elimination of Riparian & Mass Wasting modules assumes standard rules are going to be sufficient to minimize cumulative effects	❖ Essentially the same as Alternative 1 ❖ Required monitoring should improve efforts to address cumulative effects



Alternative 1

Watershed analysis was developed as “a principle but not an exclusive section of the forest practice rules” that addresses cumulative effects (WFPB 1994). Under Alternative 1, the strength of the cumulative effects assessment method is in identifying and reducing the dominant, direct physical effects of forest land uses on salmonid habitat. In terms of the criteria put forth by Collins and Pess (1997), the process would be slightly improved through the incorporation of an eastside hydrology module.

Alternative 2

Under Alternative 2, new modules would be incorporated into the watershed analysis process. The intent of these new modules is to strengthen the ability of the process to capture all relevant inputs in the context of cumulative effects of forest practices on fish habitat and general water quality. There is an inherent assumption that streamlining the process by standardizing the prescriptions (through upgraded riparian, unstable slope, and forest road rules) for the riparian, mass wasting, and surface erosion modules will not result in decreased protection of these resources because of less site-specific analysis.

DNR intends to complete statewide hazard mapping to the same level of quality as accomplished through the current mass wasting module. Long-term studies could test the assumption that cumulative effects are adequately addressed with the standard rules.

Alternative 3

Alternative 3 is essentially the same as Alternative 1 in terms of providing a cumulative effects assessment methodology. The resource assessment phase would be improved by the development of an eastside hydrology module.

(b) Providing a Watershed Restoration Tool

In their evaluation of Washington’s program of watershed analysis, Collins and Pess (1997) conclude that of the three stated management objectives, watershed analysis is

“least well developed as a restoration assessment and planning tool.” They suggest that for the program to meet its goal of providing a tool to guide watershed restoration, it “needs defined goals and critical assessment methods,” including an assessment of historic productivity.

Table 3 provides a summary of how each of the alternatives meets the goal of providing a restoration tool.

Table 3. Summary of How Each Alternative Meets the Goal of Providing a Restoration Tool

Alternative 1 (No Action = Current Rules)	Alternative 2 (Proposed Action = Forest & Fish Report)	Alternative 3
❖ Same success rate in meeting goals of providing a Restoration Tool as currently exists. See discussion.	❖ Development of restoration module	❖ A restoration plan would be required for all new assessments



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Alternative 1

As stated above, Collins and Pess (1997) found the current watershed analysis approach to be severely lacking as a restoration assessment and planning tool. There would not be an improvement to this aspect of watershed management under Alternative 1.

Alternative 2

Under Alternative 2, a restoration module would be developed and incorporated into the watershed assessment process. This should result in a significant improvement to providing a restoration assessment and planning tool for all WAUs. With limited knowledge of how the results of this module would be implemented on the ground, it is difficult to compare it to Alternative 3's requirement of a "restoration plan" for all future watershed analyses.

Alternative 3

Under Alternative 3, a restoration plan would be required for all new watershed analyses. This should result in a significant improvement to providing a restoration assessment and planning tool for all WAUs. With limited knowledge of how the results of this module would be implemented on the ground, it is difficult to compare it to Alternative 2's requirement of a "restoration module" for all future watershed analyses.

(c) Providing an Adaptive Management Strategy

Watershed analysis complements the Adaptive Management Strategy of the Forest Practices Rules. See Appendix I for a detailed discussion of Adaptive Management.